Arc magma-induced mantle refertalization: a case study of plagioclase peridotite in the Mineoka-Setogawa Belt, central Japan

*Yuji Ichiyama[1]

1. Chiba University

The Mineoka-Setogawa Belt, a Paleogene accretionary complex, is distrusted in the northern surroundings of the Izu Peninsula, central Japan. This belt contains ophiolitic mélange composed of serpentinized peridotite, mafic to felsic plutons and mafic volcanics. The serpentinized peridotite consists mainly of harzburgite, with a trace amount of lherzolite and dunite (Arai, 1991). In particular, the Mineoka-Setogawa harzburgite is characterized by containing calcic plagioclase (Takasawa, 1976; Arai and Takahashi. 1988). The Mineoka-Setogawa peridotite is sometimes intruded by the various sizes of hornblende gabbro dikes and veins. In the boundary between peridotite host and gabbro dike/vein, orthopyroxene (or sometimes anthophyllite) walls formed. In the case of thin gabbroic veins (<1 cm), HFSE-rich phases, such as zircon, ilmenite, rutile, and apatite, crystallized in the veins and wall minerals. These HFSE-rich phases could have formed through the interaction between magma and mantle. The above characteristics of the Mineoka-Setogawa peridotite are well similar to those of refertilization observed in abyssal peridotite from spreading axes (e.g., Dick et al., 2010; Morishita et al., 2004). The formation of the orthopyroxene walls as reaction products in the Mineoka-Setogawa peridotite indicates that the reactant magma could have been hydrous and Si-rich arc-related magma.

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